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## APPLIED PHYSICS

FIS/07 - 6 CFU - 1° Semester

### Teaching Staff

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### LEARNING OBJECTIVES

The aim of the course is to provide the basic knowledge needed to understand the concepts and their physical methods that are applied to medicine. In particular the student will gain knowledge of some basic physical laws and techniques for the understanding of the physiological processes and will learn the basic concepts useful to the correct use of the equipment used at work. What prerequisites are required basic knowledge of algebra, Euclidean geometry and trigonometry.

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### DETAILED COURSE CONTENT

**BASES:** Operative definition. I.S.U. Dimension, radiant. Characteristics of instruments: Errors. Arithmetic mean and standard deviation. Scalars, vectors.

**MOVEMENT:** Position, speed and acceleration.

**MECHANICS:** The three laws. Weight force. Rigid bodies. Center of gravity, moment of a force. Static equilibrium. Levers in the human body. Work and kinetic energy. Potential energy. Power.

**FLUIDS:** Static and dynamics of fluids. Bernoulli's theorem. Influence of viscosity. Blood pressure.

**Thermodynamics:** Zeroth law, temperature, thermometers, I law, the internal energy. Heat and work, specific heats, phase transition, metabolic power, energetic value of food, thermoregulation. II law.

**ELECTRICITY** The electric charge, electric field, Coulomb's law, conductors and insulators. The Coulomb. Electric potential. The electric current. Electrical circuits. Resistance, Ohm's law. Joule effect. dielectric constant. Electrical risk.

**WAVES:** Elastic and electromagnetic waves. Longitudinal, transverse and surface waves. Sound. the decibel. Technical applications and biological effects of ultrasound. The electromagnetic spectrum, action of ionizing radiation in biological tissues. The X-ray dosimetric quantities and units of measurements.

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## **TEXTBOOK INFORMATION**

D. Scannicchio - Fisica Biomedica - EdiSES, Napoli 2013

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